

INVENTIONS & INNOVATION

Success Story



GUIDE FOR WINDOW GROUTING DEVICE

Existing Single-Pane Wood Windows Become Energy Efficient, Double-Pane Low-E Windows

Benefits

- ◆ Costs 25% to 100% less than traditional window replacement
- ◆ Saves about 8.5 million Btu per year
- ◆ Has saved through 2000:
 - 0.32 trillion Btu of energy
 - 20,000 tons of avoided CO₂ emissions
 - \$1.7 million in avoided energy purchases
- ◆ Has potential to save a cumulative total of 1.75 trillion Btu nationwide through 2010

Applications

The Bi-Glass System allows renovating an old sash instead of replacing the window with a new one. Classic structures are easily restored to earlier beauty with improved efficiency, while meeting the strictest of historical guidelines.

Capabilities

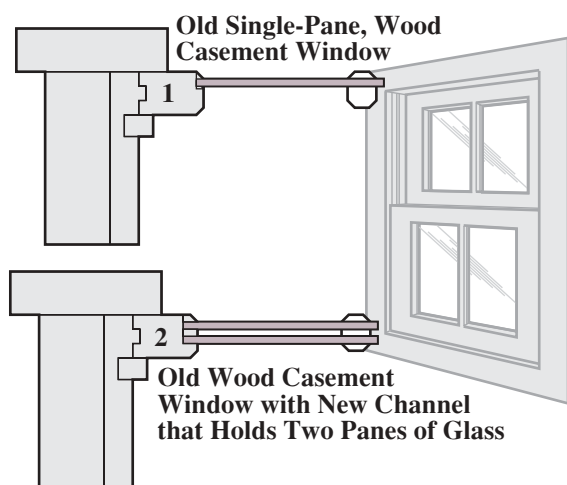
- ◆ Allows the size of the rabbit joint in a single-pane wooden window to be increased to accommodate double-glazing
- ◆ Allows windows to be removed and replaced in a mobile workshop within hours.

Renovating homes, especially historic homes, is a difficult task. The desire to retain the building's character and actual historic materials competes with the desire to improve energy performance. Replacing single-pane windows with double-pane windows significantly reduces heating and air conditioning costs. However, window replacement is expensive and can alter the home's architectural integrity.

With a grant from the U.S. Department of Energy's (DOE's) Inventions and Innovation Program, Bi-Glass Systems developed a tool guide to control the operation of a router for converting single-glazed wooden-framed windows to double-glazed windows. Single-pane glass is replaced with panes that are more energy-efficient without replacing the sash members or the entire window.

In a Bi-Glass conversion, a trained technician removes the original window sash from the frame and takes it to a mobile workshop, where a patented tool package is used to route out the old window putty and glass. Next the new, insulated glass is installed using glazing tape and caulking. The interior grillwork remains intact and virtually unchanged. In addition, new jamb liners, weatherstripping, insulation, and locks are installed to eliminate all drafts. The sashes are then reinstalled into their openings and adjusted to fit snugly.

Before-and-After Cross Section of Treated Window

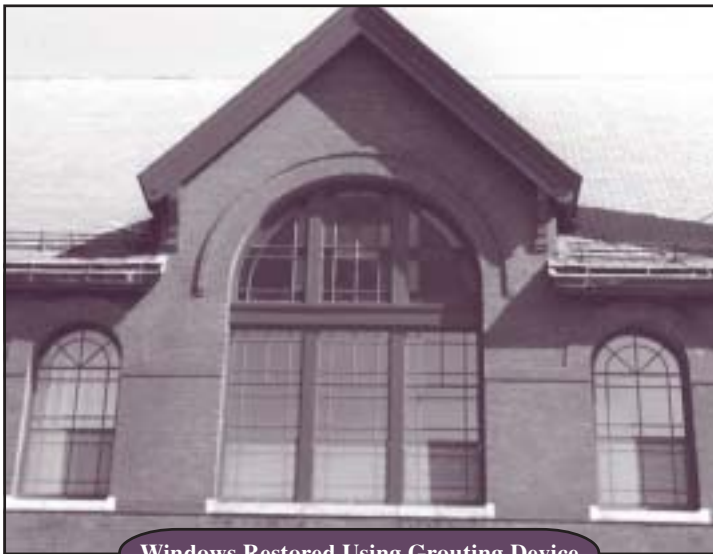


Energy Savings and Pollution Prevention

In the past ten years, almost 11,000 homes have been made more energy efficient using the Bi-Glass System. The result is an estimated 20% annual reduction in energy costs or about 8.5 million Btu per year for a house where all windows are upgraded. This represents a nationwide energy savings of 0.09 trillion Btu per year for all installations. Through 2000, the cumulative savings totals about 0.32 trillion Btu and \$1.7 million in avoided energy purchases. The associated cumulative reduction in CO₂ emissions is 20,000 tons. At a 10% growth rate, the technology could save a cumulative total of 1.75 trillion Btu nationwide through 2010.

System Economics and Market Potential

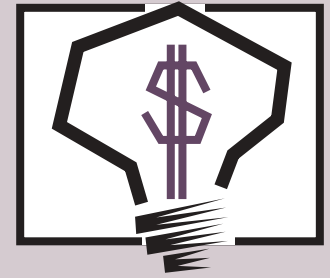
Currently, the United States has about 16 Bi-Glass licensees and England has 2 licensees. Each licensee installs about 1000 windows per year. Many of the Bi-Glass regional licensees are listed on the Bi-Glass web page, which includes contacts and their areas of service. Installers are located throughout the United States and England.



Windows Restored Using Grouting Device

INVENTIONS AND INNOVATION PROGRAM

The Inventions and Innovation Program provides financial assistance for establishing technical performance and conducting early development of innovative ideas and inventions. Ideas that have a significant energy-savings impact and future commercial market potential are chosen for financial support through a competitive solicitation process. Inventions funded by the program have saved enough energy to light 10 million homes per year. In addition, the program offers technical guidance and commercialization support to successful applicants. Ideas that benefit the Industries of the Future, designated by the Office of Industrial Technologies as the most energy-intensive industries in the United States, are especially encouraged.



"This simple tool developed with assistance from an Inventions and Innovation grant is saving energy in factories, schools, and homes across the nation."

— Jim Conachen
Inventor
Bi-Glass Systems

Project Partners

- ◆ Inventions and Innovation Program
Washington, D.C.
- ◆ Bi-Glass Systems
Canton, MA

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